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We compared reproductive success, nest site characteristics, and food habits of nesting Swainson's (*Buteo swainsoni*) and red-tailed (*B. jamaicensis*) hawks along the Big Lost River and Birch Creek on the Idaho National Engineering Laboratory between 1991 and 1993. Productivity was similar between species. Twenty-six red-tailed hawk nests produced 37 fledglings (1.3/attempt) while 17 Swainson's hawk nests produced 21 fledglings (1.2/attempt). Nest trees used by Swainson's hawks were shorter, smaller, and in better condition than those used by red-tailed hawks ( $P < 0.01$ , Wilcoxon). Swainson's hawk nest trees were more foliated than most trees along Birch Creek and the Big Lost River ( $P < 0.006$ , Wilcoxon). Red-tailed hawk nest trees were similar to available trees. Food habits were similar between hawk species with *Microtus* spp. and leporids comprising the majority of prey consumed. Riparian vegetation condition, notably the lack of cottonwood and willow regeneration, appeared to be a major factor accounting for a decline in Swainson's hawk nesting along river channels on the INEL.

#### THE SWAINSON'S HAWK PRODUCTIVITY CRASH

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Swainson's hawks (*Buteo swainsoni*) were healthy and reproducing consistently well in western Saskatchewan from 1969 through 1987. Suddenly trouble became apparent, with six consecutive "bad" years occurring in a row, the six worst in 25 yr. Decreased productivity became evident in both grassland pastures and croplands near Kindersley in 1988, but at Alsask only in 1992. By 1993, the number of nesting pairs in Kindersley was less than half of that found 10 yr previously, most pairs failed, and even the successful pairs raised only one young per nest. The decline began in drought years and accelerated in two wet years, but finally began to reverse at Kindersley in 1994. Through 1993, the drastically decreased numbers of Richardson ground squirrels (*Citellus richardsonii*), the hawk's main prey species, may in part have been related to increased numbers of foxes (*Vulpes* spp.) and coyotes (*Canis latrans*).

#### SEXUAL AND GEOGRAPHICAL COLOR VARIATION AMONG SWAINSON'S HAWKS

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We examined ventral plumage coloration of breeding Swainson's hawks (*Buteo swainsoni*). These hawks are highly variable in their plumage coloration and this variation was due to differences in the color of melanin pigment and differences in pigment distribution. Females tended to be darker than males. Swainson's hawks were smaller and darker in California than in Alberta. We could find no differences in reproductive success based on plumage. A comparison of parents and offspring suggests that the differences in coloration are heritable.

#### SWAINSON'S HAWK ASSOCIATIONS IN THE SACRAMENTO VALLEY'S AGRICULTURAL LANDSCAPE

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Most studies of Swainson's hawk (*Buteo swainsoni*) foraging habits and habitat use involve monitoring of birds within a cluster of home ranges. The interpretative value of these studies can be increased by integrating their results with those from studies across a much larger spatial scale. I designed an extensive sampling program to express foraging habits and habitat use across many potential home ranges, thereby representing the population-level interaction with an agricultural landscape. After 5 yr and 110 surveys along a 200-km road transect from a car traveling at 50–55 mph, I made 151 observations of Swainson's hawk. These observations were mapped on a GIS and analyzed for associations with attributes of the landscape. Most Swainson's hawk observations were on a short stretch of transect in the east-west center of the valley near riparian habitat and groves of valley oak (*Quercus lobata*). Most (82%) were of birds in flight, and 62% were in groups, including 15 pairs and a foraging group of 23 individuals. Given the percentages of landscape elements along the transect, Swainson's hawks were observed less often than expected by chance at irrigated pasture, rice and rice stubble, and plowed fields with very little plant debris. They preferred alfalfa (especially stands >2 yr old), riparian habitat, asparagus, and especially, annual field crops during harvest and till. In addition to conditions on its wintering range, the future status of the Swainson's hawk population in the Sacramento Valley will depend on trends in crop acreage, cultural practices, and the extent of high-quality nesting habitat across the landscape. The Swainson's hawk population in the Sacramento Valley might increase substantially by establishing a well-connected network of nesting and prey-bearing habitat corridors, which is central to the proposed Habitat Management Program of Yolo County, California.

#### ANNUAL TURNOVER AND REPRODUCTIVE SUCCESS OF MARKED ADULT SWAINSON'S HAWKS IN THE BUTTE VALLEY, CALIFORNIA